Signal Changes in the Corpus Callosum Following Ventricular Shunt Placement

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Disclosures

None

Background

- Ventricular shunting is the standard treatment for obstructive hydrocephalus.
- In ~8% of patients, post-shunt signal abnormalities of the corpus callosum (CC) have been reported.[1]
- These changes are usually described months after shunt placement, but acute and severe changes can also occur.
- Proposed mechanisms: traction/edema from rapid decompression. Imaging findings are often more dramatic than clinical presentation.[2]

Background

- Why does this matter?

- Corpus callosum signal changes can mimic ischemia, demyelinating disease, or neoplasm, leading to misdiagnosis and unnecessary workup.

Purpose

- To review cases of corpus callosum signal abnormality following ventricular shunt placement or reprogramming.
- To describe the imaging patterns, timing, and clinical correlates across 3 patients at a single tertiary academic center.
- To increase awareness of this phenomenon and highlight how to distinguish it from mimics (ischemia, demyelination, neoplasm).

Methods

- Design: IRB-approved retrospective review at a single tertiary care academic center.
  - Inclusion criteria: Patients with post-shunt CT or MRI showing corpus callosum signal abnormality after shunt placement or reprogramming for hydrocephalus.

- Data collected:
  - Etiology of hydrocephalus
  - Imaging modality and timing
  - Distribution and pattern of corpus callosum abnormality
  - Evolution on follow-up imaging
  - Clinical presentation and symptoms of callosal disconnection

Results

3 patients with post-shunt corpus callosum (CC) signal abnormality were identified.

Results

CASE 1

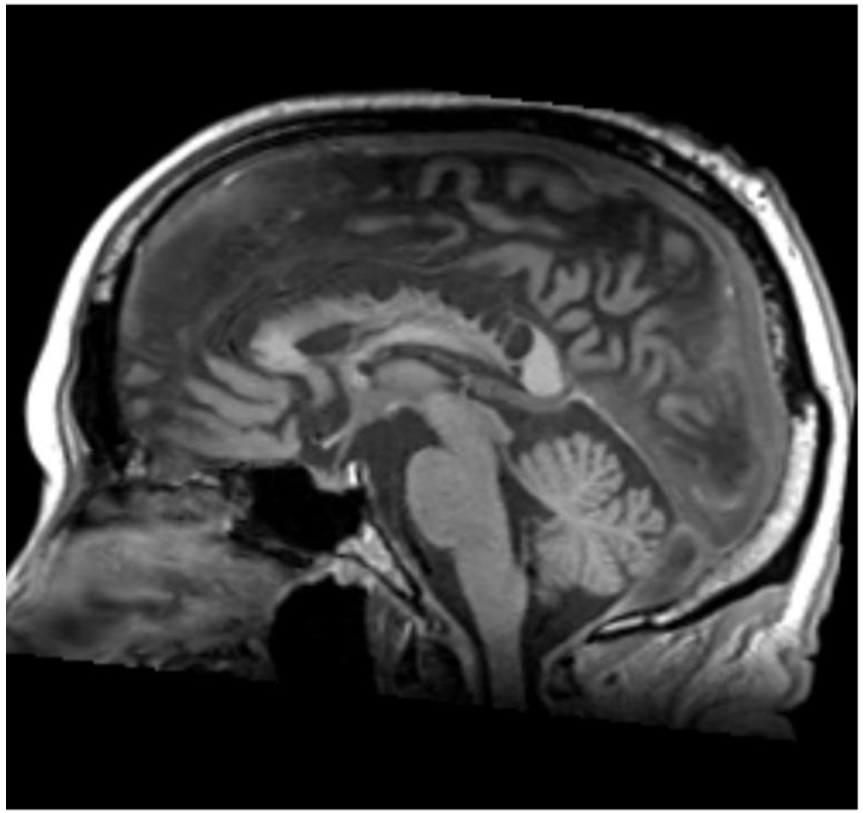
- 79-year-old male
- Etiology for obstructive hydrocephalus: acquired aqueductal stenosis
- Intervention immediately preceding callosal signal change: VP shunt placement
- Time from intervention to signal change: 1 day
- Evolution of signal change: persisted at 6 months
- Clinical outcome: no callosal disconnection symptoms

Results | Case 1

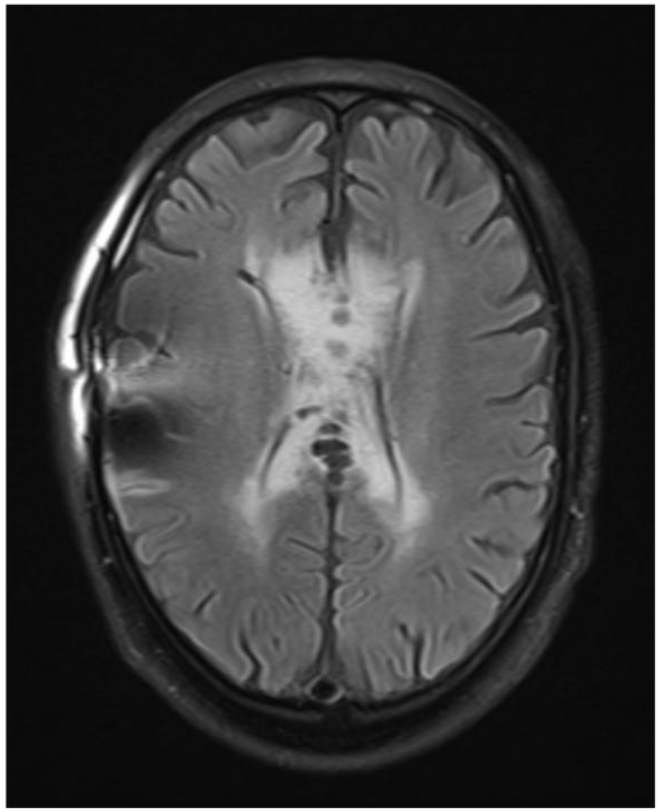
Immediate postprocedural coronal CT image showing enlargement of the lateral and 3rd ventricles.

Following marked decompression of the ventricles, there is abnormal hypoattenuation in the corpus callosum apparent on this coronal CT image.

Results | Case 1



A sagittal T1-weighted MRI image shows CSF intensity cystic areas throughout the corpus callosum, particularly near its superior margin.



An axial T2-FLAIR MRI image hyperintensity throughout the corpus callosum with signal suppression in the cystic components.

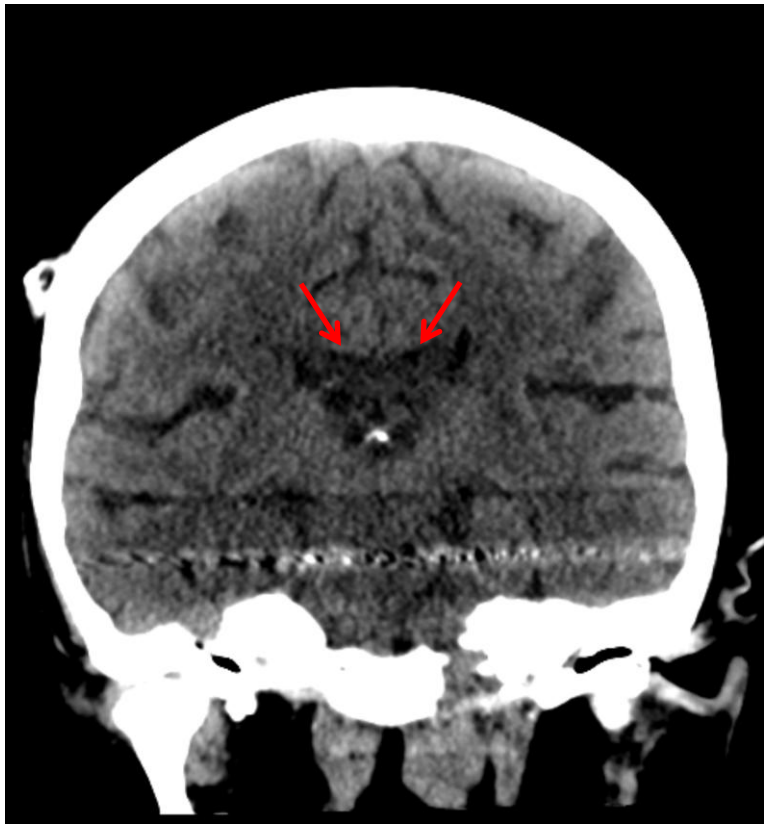
Results

CASE 2

- 77-year-old female
- Etiology for obstructive hydrocephalus: skull base mass (chondrosarcoma)
- Intervention immediately preceding callosal signal change: VP shunt placement
- Time from intervention to signal change: 3 weeks
- Evolution of signal change: persisted at 1 month
- Clinical outcome: no callosal disconnection symptoms

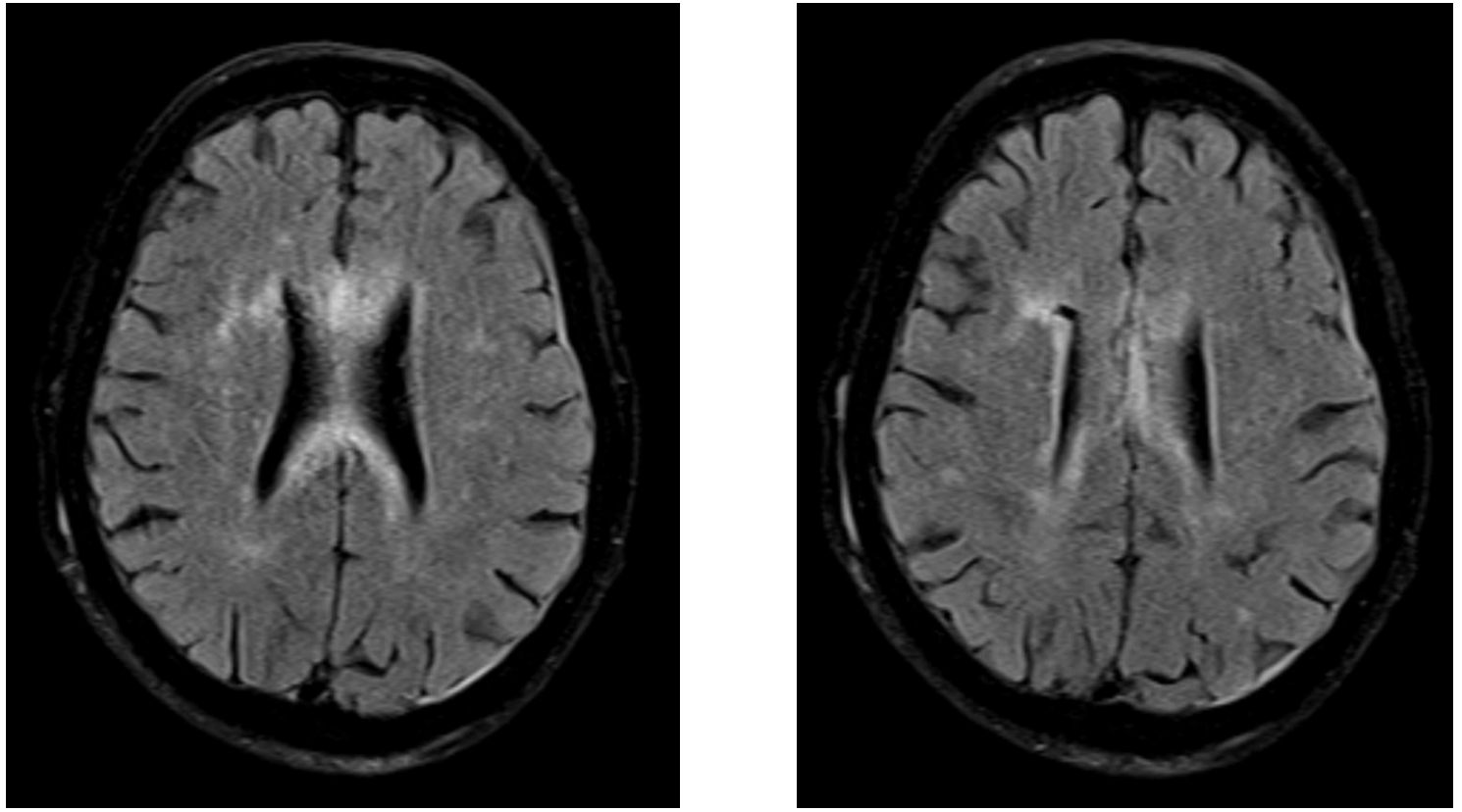
Results | Case 2

Preprocedural coronal CT image showing enlargement of the lateral and 3rd ventricles



Following marked decompression of the ventricles after shunt placement, there is abnormal hypoattenuation in the corpus callosum as shown on this coronal CT image.

Results | Case 2



Axial T2-FLAIR images from an MRI obtained 6 weeks later demonstrate abnormal hyperintense signal throughout the corpus callosum.

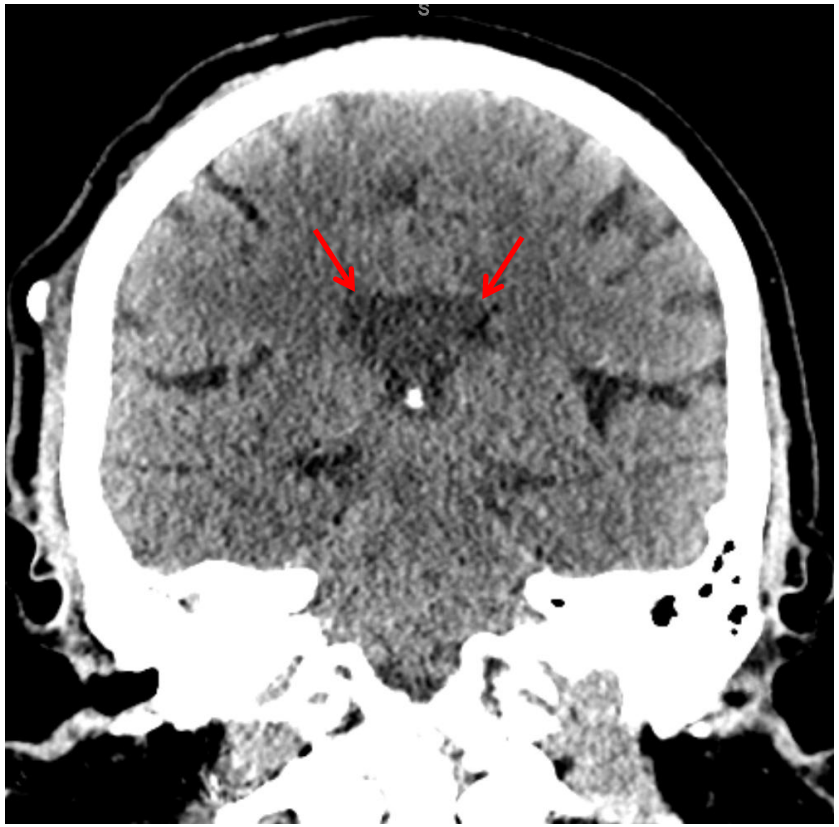
Results

CASE 3

- 59-year-old male
- Etiology for obstructive hydrocephalus: spontaneous cerebellar hemorrhage
- Intervention immediately preceding callosal signal change: Shunt reprogramming
- Time from intervention to signal change: 1 day
- Evolution of signal change: largely resolved by 3 months
- Clinical outcome: no callosal disconnection symptoms

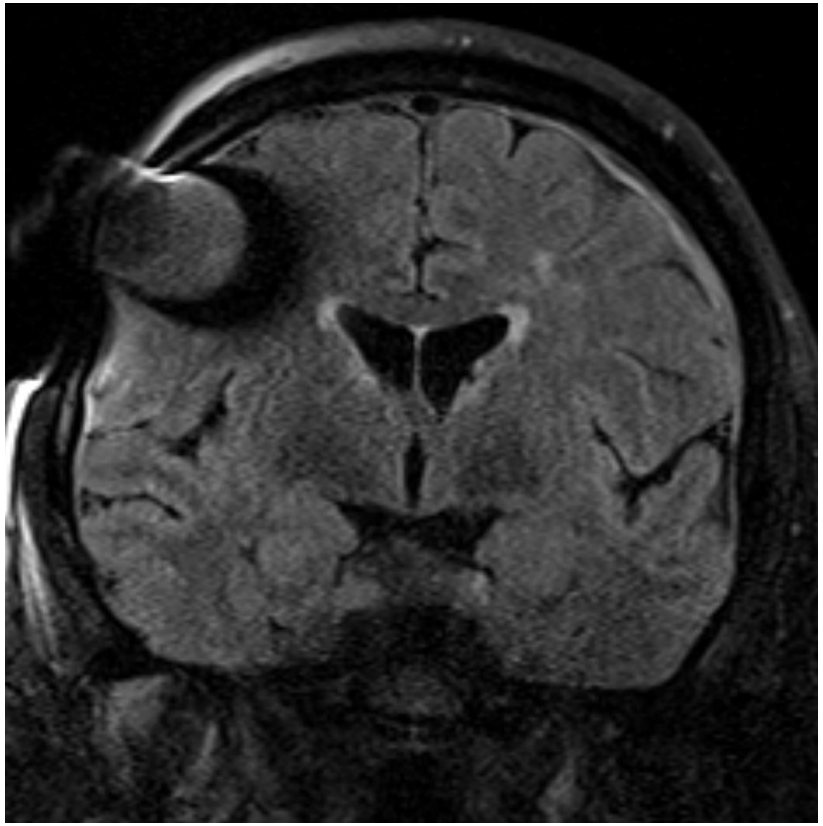
Results | Case 3

Preprocedural coronal CT image showing enlargement of the lateral and 3rd ventricles



Following marked decompression of the ventricles after shunt reprogramming, there is abnormal hypoattenuation in the corpus callosum as shown on this coronal CT image.

Results | Case 3



A coronal T2-FLAIR image from an MRI obtained 3 months later demonstrates essential resolution of the signal abnormality in the corpus callosum.

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Conclusion

- In our cohort, all three patients developed corpus callosum signal abnormality after shunt placement or reprogramming.
  - The onset was variable, appearing as early as Day 1 post-placement, several weeks later, or following shunt reprogramming.
  - The course also differed, with persistent findings at six months in one case, persistence at one month in another, and near-resolution by three months in the third.
  - Clinically, none showed clinical signs of callosal disconnection, though one had transient confusion that improved after shunt reprogramming.
- Recognition of this entity helps avoid misdiagnosis as ischemia, demyelination, or neoplasm, and supports appropriate shunt evaluation.

References

1. Su, S., McArdle, D., & Gaillard, F. (2020). Post-shunting corpus callosal signal change and review of the literature. Journal of Clinical Neuroscience, 72, 308–314. https://doi.org/10.1016/j.jocn.2019.12.032
2. Lane, J. I., Luetmer, P. H., & Atkinson, J. L. (2001). Corpus callosal signal changes in patients with obstructive hydrocephalus after ventriculoperitoneal shunting. AJNR Am J Neuroradiol, 22(1), 158–162.

Thank you!